REMARKS

Applicants appreciate the time taken by the Examiner to review Applicants' present Application and respectfully request continued examination, reconsideration and favorable action in this case.

To advance prosecution of this case, Applicants request to cancel Claims 7, 9-14, 21, 23-28, 35, and 37-42. Applicants have also added Claims 49-69 in response to Examiner's objections and have added Claims 70-78 to more completely claim Applicants' invention.

Rejections under 35 U.S.C. § 103(a)

The Examiner rejected Claims 1, 2, 4, 5, 15, 16, 18, 19, 29, 30, 32, 33, 43, 45, 46, and 48 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,928,750, issued to Nurczyk, in combination with Official Notice, U.S. Patent No. 5,251,124, issued to Matsunaga, and U.S. Patent No. 5,043,862, issued to Takahashi, et al.

Applicants respectfully submit that neither Nurczyk, Official Notice, Matsunaga, nor Takahashi teach, suggest, or make obvious the combination of a Variable Air Volume terminal, as disclosed in Nurczyk, with plural flow sensing inputs of the Official notice, with the fuzzy logic controller disclosed in Matsunaga, and with the auto-tuning controller disclosed in Takahashi. Absent such suggestion, there would be no reason why one skilled in the art, faced with Applicants' problem of creating a simpler and more effectively operable Variable Air Volume("VAV") terminal controller and

VAV system and having no prior knowledge of Applicants' claimed structure, would consult the combination of references suggested by the Examiner.

Takahashi discloses a system for automatically setting PID constants used for process control wherein the PID constants are derived through fuzzy reasoning. Takahashi does not disclose using fuzzy logic to compare a set point and a measured variable to derive a control signal, and in particular does not disclose such a use in a VAV system. Instead, Takahashi uses fuzzy logic to derive the PID constants used in a PID process control system to generate a control response. This type of PID control algorithm is the type of algorithm discussed in the current Application, in the specification at page 4, lines 7-21, as complex and error prone. Takahashi therefore teaches away from using a fuzzy logic control algorithm by disclosing a method for improving a PID control algorithm using fuzzy logic to derive the constants used in such a control algorithm.

Similarly, Matsunaga discloses a fuzzy logic controller meant to improve fuzzy logic control of an object in a steady-state mode of operation, but does not teach or suggest the use of such a controller for a VAV system. Matsunaga, in fact, discloses an improved fuzzy logic controller, but does not disclose or suggest a particular use for such a controller. As discussed above with reference to Takahashi, Applicants respectfully submit that it is not always obvious or conventional to use a fuzzy logic controller, such as disclosed in Matsunaga, in automatic control to implement a

comparison of a setpoint and a measured variable. At least in the case of VAV systems, PID control algorithms are the prior art and it is not obvious to combine the above references to apply fuzzy logic control algorithms to VAV systems in view of the fact that at least Takahashi specifically teaches away from such a combination, and Matsunaga does not suggest such a combination. One skilled in the art of VAV systems and their associated control methods would therefore not be likely to use either Takahashi, or Matsunaga, alone or in combination with any other reference, including Nurczyk, to attempt to solve the problem solved by Applicants.

Applicants respectfully submit that for the reasons given above Claims 1, 15, 29, 43, and 46 meet the requirements of § 103(a). Claims 2, 4, and 5 depend from Claim 1 and contain, by virtue of their dependency, all the limitations of Claim 1. Claims 16, 18, and 19 depend from Claim 15, and contain, by virtue of their dependency, all the limitations of Claim 15. Claims 30, 32, and 33 depend from Claim 29, and contain, by virtue of their dependency, all the limitations of Claim 29. Claim 45 depends from Claim 43, and contains, by virtue of its dependency, all the limitations of Claim 43. Claim 48 depends from Claim 46, and contains, by virtue of its dependency, all the limitations of Claim 46. Accordingly, Applicants respectfully submit that Claims 2, 4, 5, 16, 18, 19, 30, 32, 33, 45, and 48 also meet the requirements of § 103(a). Applicants therefore respectfully request the Examiner to reconsider and withdraw the rejections and allow Claims 1, 2, 4, 5, 15, 16, 18, 19, 29, 30, 32, 33, 43, 45, 46, and 48.

The Examiner rejected Claims 3, 8, 17, 22, 31, and 36 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,928,750, issued to Nurczyk, in combination with U.S. Patent No. 5,251,124, issued to Matsunaga, U.S. Patent No. 5,043,862, issued to Takahashi, et al., and Official Notice, and further in view of U.S. Patent No. 4,969,508, issued to Tate, et al.

Claims 3 and 8 depend from Claim 1, and contain, by virtue of their dependency, all the limitations of Claim 1. Claims 17 and 22 depend from Claim 15, and contain, by virtue of their dependency, all the limitations of Claim 15. Claims 31 and 36 depend from Claim 29, and contain, by virtue of their dependency, all the limitations of Claim 29. For the same reasons as discussed above, Applicants respectfully submit that Claims 1, 15, and 29 meet the requirements of § 103(a), and therefore Claims 3, 8, 17, 22, 31, and 36 also meet the requirements of § 103(a). Applicants accordingly respectfully request the Examiner to reconsider and withdraw the rejections and allow Claims 3, 8, 17, 22, 31, and 36.

Claims 6, 20 and 34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,928,750, issued to Nurczyk, in combination with U.S. Patent No. 5,251,124, issued to Matsunaga, U.S. Patent No. 5,043,862, issued to Takahashi, et al., and Official Notice, and further in view of U.S. Patent No. 4,818,970, issued to Natale, et al.

Referring to the rejection of Claims 6, 20, and 34 in view of Natale, et all, the Examiner states that "to prevent the spreading of a fire it would have been obvious to provide

the primary reference with a fire control mode," since Natale, et al (the primary reference) "shuts down air flow in response to a fire condition."

Applicants respectfully submit that Natale, et al, does not teach, suggest or make obvious the invention recited in Claims 6, 20, and 34 because the cited reference does not teach or disclose a fire control mode of operation for a variable air volume terminal controller. Natale, et al, instead teaches a method for sensing and responding to a fire in or outside of an air moving and filtering unit being used to negatively pressurize a containment area for control of airborne contamination of particulate matter. Upon sensing a fire condition outside of the air moving and filtering unit, the invention disclosed in Natale, et al, disables the blower motor of the air moving and filtering unit to prevent spreading of the fire. Natale, et al, discloses a very specific fire control method (shutting down a negative ventilation system) for a specific application (control of airborne particulate contamination)

By contrast, Claims 6, 20, and 34 of Applicants' invention disclose a fire mode of operation for a variable air volume terminal in the event of a fire in the variable air volume terminal controller itself. Furthermore, Applicants' invention, unlike Natale, et al, does not simply require that the variable air terminal blower motor be disabled in the event of a fire, but instead also can control an auxiliary fan, and a first and second heater. Additionally, Applicants' invention is not confined to fire conditions occurring in a

space supplied with ventilation by the system being controlled, but encompasses the possibility of a fire in the controller of the invention itself, and hence the fire mode of operation recited in Claims 6, 20, and 34 can serve as mode of operation for the controller disclose in the event of a casualty to the controller itself.

Furthermore, Claims 6, 20, and 34 depend from Claims 1, 15, and 29, respectively, and contain, by virtue of their dependency, all the limitations of their respective base claims. For the same reasons as discussed above with respect to the other cited references, Applicants respectfully submit that Claims 1, 15, and 29 meet the requirements of § 103(a), and therefore Claims 6, 20, and 34 also meet the requirements of § 103(a). Applicants accordingly respectfully request the Examiner to reconsider and withdraw the rejections and allow Claims 6, 20, and 34.

Rejections under 35 U.S.C. § 112

Claims 43-48 stand rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. The Examiner states that "these claims are directed to new matter because the original specification and claims were only directed to an air volume controller and there is nothing in the original case which would indicate that the instant control scheme was intended to be used in any

medium except air." The Examiner further states, "the reference to col. 7 concerning the use of hot water is clearly and add-on feature of the basic air volume controller."

Applicants submit that Claims 43-48 are supported by the specification of the original case as filed. The Examiner correctly notes that the original specification teaches a controller that can be used to control a VAV terminal. However, as part of controlling a VAV terminal that could be part of a VAV air conditioning system or other environmental management system, the controller disclosed in the present Application can also control an auxiliary fan, first and second heaters, and a hot water coil flow control valve.

As the Examiner notes, the control scheme disclosed in Applicants' present Application is intended ultimately to be used to control an air medium. However, to control the air medium, the control scheme also can be used to control alternative mediums, such as hot water in a coil, that directly affect the air medium. Even further, contrary to being simply an add-on feature, the ability to control an additional medium other than air, which in turn directly affects the air medium, is an integral embodiment of Applicants' invention. Although in a VAV terminal controller embodiment the controller disclosed by Applicants' can be used to control the temperatures in different parts of an environment by modulating the flow of air having a constant temperature, an integral part of controlling the flow of air includes the ability to maintain the desired air temperature to begin with. Controlling the temperature of the air by, for

example, controlling the flow of hot water to a heating coil, is therefore not only within the scope of Applicants' invention as disclosed, but clearly more important than a simple add-on feature.

This can be shown even further by noting that although the disclosed controller can be used to control the climate in different locations of an environment by modulating air flow, it can also maintain airflow constant and modulate the temperature of the air.

Applicants therefore respectfully request the Examiner withdraw the rejections and allow Claims 43-48.

Objections to Claims 7, 9-14, 21, 23-28, 35, and 37-42

The Examiner objected to Claims 7, 9-14, 21, 23-28, 35, and 37-42 as being dependent upon a rejected base claim, but stated that the objected to claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

To comply with Examiner's suggestion, Applicants have incorporated the additional limitations contained in dependent Claims 11, 25, and 39 with the limitations of their respective base claims 1, 15, and 29, and rewritten Claims 11, 25, and 39 as new Claims 49, 56, and 63, respectively. Applicants have also rewritten Claims 7, 9, 10, 12-14, 21, 23, 24, 26-28, 35, 37, 38, and 40-42, as new Claims 50-55, 57-62, and 64-69, respectively. Claims 50-55 depend from Claim 49, Claims 57-62 depend from Claim 56, and Claims 64-69 depend from Claim 63. Applicants have also canceled Claims 7, 9-14, 21, 23-28, 35,

and 37-42.

Applicants submit that Claims 49-69 are in a condition for allowance as suggested by the Examiner as replacements for Claims 7, 9-14, 21, 23-28, 35, and 37-42.

New Claims

For the reasons discussed above, Applicants have added Claims 49-69 to overcome the Examiner's objections to Claims 7, 9-14, 21, 23-28, 35, and 37-42.

Applicants have also added Claims 70-78 to more particularly claim Applicants' invention. Applicants added Claims 70-71 and 77-78 to recite the limitations that the controller is a variable air volume controller (Claim 49), that the environmental control system is a variable air volume air conditioning system (Claims 49 and 56) and that the actuator is a control valve actuator for adjusting the flow of water through a heating coil (Claims 50 and 57). Claims 70 and 71 depend from Claim 43 and Claims 77 and 78 depend from Claim 46. Therefore, Applicants submit that, for the same reasons as discussed above with regard to Claims 43-48, Claims 70, 71, 77, and 78 are patentable.

Claims 72, 73, 74, 75, and 76 add the limitations recited in Claims 3, 4, 5, 12, and 14, respectively, to base Claim 43. Claims 72-76 depend from Claim 43 and are therefore patentable for the same reasons as Claim 43.

CONCLUSION

Applicants appreciate the Examiner's efforts to review this case. Applicants have made an earnest attempt to place this case in condition for allowance and request continued examination and reconsideration of the Application. For the foregoing reasons and for other reasons clearly apparent, Applicants respectfully request full allowance of Claims 1-6, 8, 15-20, 22, 29-34, 36, and 43-78.

An extension of one (1) month is requested and a Notification of Extension of Time Under 37 C.F.R. § 1.136 with authorization to charge the appropriate fee.

The Commissioner is hereby authorized to charge any fees or credit any overpayments to Deposit Account No. 50-0456 of Gray Cary Ware & Freidenrich, LLP.

Respectfully submitted,

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